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ON REPORTED PLEISTOCENE HUMAN REMAINS AT VERO, FLORIDA

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Topographic relations.—Vero, a village on the Florida East Coast Railway, 228 miles south of Jacksonville, in St. Lucie County,[2] is situated on the surface of the Pensacola terrace, the lowest and youngest of the three Pleistocene terraces recognized in Florida by Matson,[3] and is about one mile west of the western shore of Indian River, between which and the Atlantic Ocean lies the great barrier beach of east Florida. The terrace plain presents the physiographic aspect of early youth, as it is almost flat and is only slightly trenched by rather indefinite drainage courses. Its surface stands between 10 and 15 feet above sea-level, except along an elevated barrier beach which lies some 600 or 700 feet west of the railroad, where the altitude may be as much as 10 to 15 feet higher. The human remains were found in a slight depression along a drainage course across the terrace surface at localities about half a mile north of Vero and between 330 and 580 feet west of the railroad, and were exposed as a result of the excavation of the Indian River Farms Company drainage canal.

Geologic relations.—Dr. Sellards has in three papers[4] presented detailed descriptions of the geologic section exposed along the canal from the Florida East Coast Railway on the east to a point about 580 feet westward from it. The stratigraphic succession may be summarized as follows: (1) The lowest observed bed is an arenaceous shell marl of Pleistocene age, the exposed thickness of which is from 2 to 6 feet. (2) Unconformably above bed No. 1 are sands, some muck, and marl, having a combined thickness ranging up to as much as 5 or 6 feet. This formation was deposited in fresh water and contains numerous species of vertebrates, which clearly indicate its Pleistocene age, and shells of about 30 species of land and fresh-water mollusks. The discovery of a locality at which so many species of extinct vertebrates are represented is of much geologic interest and importance. Within the sands human remains were found at two places, according to Dr. Sellards. (3) Overlying No. 2 is a deposit of muck, tree trunks, and other vegetable matter, in which are stringers of sand, in places containing marine shells, perhaps derived from bed No. 1 by erosion farther upstream. This deposit was accumulated in a shallow, relatively wide, channel eroded in No. 2, and has a thickness of 3 feet 6 inches in the middle of the channel, but it is much thinner on the channel sides. Whether its geologic age is Pleistocene or Recent has not been positively determined. Dr. Sellards reports human bones from near the base of this bed and from sands which lie at its base along the contact with No. 2.[1]

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[1] Published by permission of the Director of the United States Geological Survey.

[2] See the map of State of Florida, scale 1/500,000, issued by the United States Geological Survey in 1916, and the United States Coast and Geodetic Survey Chart No. 163.

[3] "Geology and Ground Waters of Florida," *U.S. Geol. Survey, Water-Supply Paper 319*, pp. 31–35, Pl. 5, 1913.

[4] "Discovery of Fossil Human Remains in Florida in Association with Extinct Vertebrates," *Amer. Jour. Sci.*, XLII (July, 1916), 1–18; "Human Remains and Associated Fossils from the Pleistocene of Florida," *Eighth Ann. Rept. Florida Geol. Survey*, 1916, pp. 122–60, Pls. 15–31; "Human Remains from the Pleistocene of Florida," *Science*, N.S., XLIV (1916), 615–17.

Criteria for determining the geologic age of the human remains.—Previous investigations having shown that human artifacts may, by many agencies, be carried below the surface of the ground and become imbedded in unconsolidated deposits, and as it is well known that human bones may have been either naturally or artificially buried, the occurrence of artifacts and human bones in association with Pleistocene fossils does not prove the Pleistocene age of man. It seems to me that the only indisputable geologic proof of the Pleistocene age of man must consist in finding a continuous undisturbed bed or layer of demonstrable Pleistocene age above the human remains (artifacts or bones) whose age is under investigation. The relative dissociation and the significance of

[1] *Eighth Ann. Rept. Florida Geol. Survey*, 1916, pp. 140–42, Pl. 17, Fig. 1, text Fig. 14.

the mineralization of the vertebrate (including the human) bones is discussed by others.

Conclusions.—As bed No. 3 may be of recent geologic age, the presence of human bones in it does not now need special consideration. With regard to the remains in bed No. 2 it will be said that as intrusion into it may have been accomplished either by natural or by artificial processes subsequent to its deposition; the presence of the human remains in it, in my opinion, is not definite proof of their Pleistocene age. However, should it be postively shown that in bed No 3 Pleistocene fossils occur *in place* above the human remains, showing that subsequent to the death of the individual represented by these remains Pleistocene species belonging to other groups of organisms lived and died, the evidence in favor of the Pleistocene age of the human remains would be conclusive. On the other hand, should it be proved that bed No. 3 is of Recent age, the human remains might be of either Pleistocene or Recent age, and it is doubtful if positive criteria for determining their age will be available unless the needed information is furnished by the human bones themselves. As the accurate determination of the geologic age of bed No. 3, especially that part of it perpendicularly above the human remains, seems to me to be critical, it is my opinion that, for the present, judgment should be suspended.